

Montana Weather/Precipitation Summary

August 2015 by NOAA's National Weather Service Great Falls Montana

A high pressure ridge aloft dominated Montana's weather during August. This was slightly stronger than normal (Fig. 1). August's temperatures averaged near normal temperature, while precipitation was mostly below normal precipitation. There were a few record warm high temperatures set early during the month, and a very cool period on the around the 21st-23rd. Record cold low temperatures were set at varied locations on these dates. Smoke from western fires was a major factor in air quality and reduction of visibility across the state. At the end of this report, there are several graphs for cities showing the visibility restrictions this year, due to smoke, compared with other years since 1980 (Fig. 4). In most cases, this year far outpaces the number of hours of smoke visibility restriction, as compared with other years.

Statewide composite temperatures averaged 0.5°F above normal for the month. The temperature anomalies ranged from -0.5°F at Billings to +2.3°F at Great Falls (Fig. 2). The warmest average monthly temperature was 73.1°F at King Coulee, and the coolest was 49.7°F at Placer Basin. This was the 60th coolest August of record. For the past 12-months, the statewide composite average temperature is 2.1°F above normal. Ten of the last 12 months have had warmer than normal temperatures.

The monthly departure from normal for precipitation across Montana is shown in Figure 3. Above normal precipitation was over southeast Montana, while the western half was dry. The highest amounts were 3.52-inches at Ridgeway and 3.30-inches at Crystal Lake. Statewide, this month averaged 0.85-inches, or 0.32-inches below normal. The statewide composite precipitation for the past 12 months is 1.42-inches below normal.

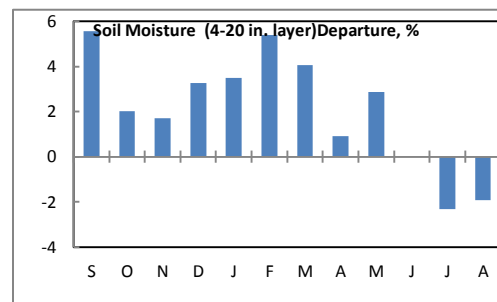
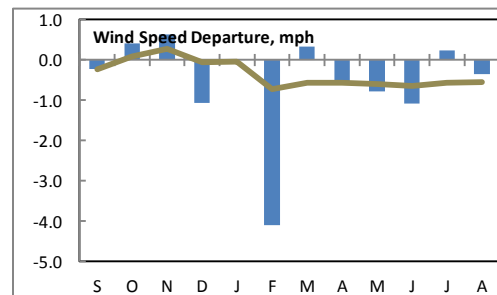
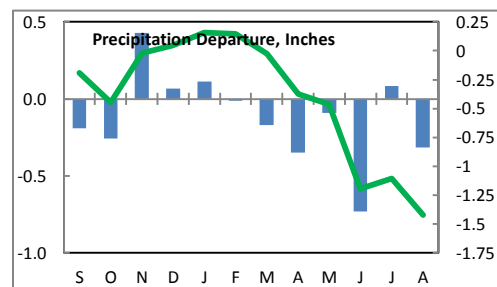
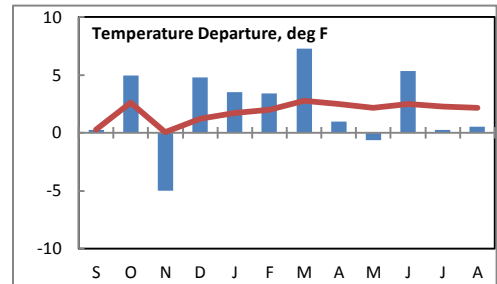
The statewide average winds were below normal this month, ranking as the 19th calmest August of record. The statewide composite average was 7.7 mph, 0.2 mph below normal. The 12-month average is running 0.5-mph below average. The fastest average speed was 12.1 mph at Sweet Grass, with a higher elevation location, Deep Creek, recording 13.9 mph. The fastest measured gust of the month, 82 mph, occurred at Deep Creek on the 31st. Babb recorded a gust of 72 mph on the 30th.

With the continued lack of precipitation across most of the state, the soil moisture values have dried out. The August average had a 1.9 point negative departure. This August ranked at the 2nd driest soil moisture of record. The driest was August 2006. Records began in 1995.

Refer to NEIC's State of the Climate report for the latest monthly discussion: <http://www.ncdc.noaa.gov/sotc/>.

August 1-4

The first few days of August averaged above normal for temperature. Record high temperatures were set at Kalispell and Cut Bank. Kalispell reached 101°F. At Kalispell, the temperature has gone over 100°F twice this summer. These were the first +100°F readings here since 2007.



August 5-8

A cold front ushered in a period of cooler-than-normal conditions. High temperatures were mostly in the 70s. A thunderstorm on the 5th produced a gust of 69 mph at Billings, and 68 mph at Acton (Yellowstone).

August 9-14

The warmest period of the month produced nearly daily thunderstorm as well. Thunderstorms on the 10th caused strong winds and damage over portions of western Montana. Missoula recorded one of their highest gusts of record (73 mph) and their highest gust of record for August. Power lines and trees were downed at Missoula and Darby. Thunderstorms on the 12th produced a gust of 61 mph at Livingston. Hot temperatures on the 13th produced record high values at Great Falls, Kalispell, Cut Bank, Helena and Lewistown. On the 14th, Wolf Point peaked at 107°F, the warmest temperature of the month. Meanwhile thunderstorms produced one-inch hail at Florence and wind gusts to 71 mph near Denton.

August 15-31

A quieter period dominated for the rest of the month. However, a highlight for this period was poor air quality due to smoke from western and Montana forest fires. The first air quality alert was issued on the 15th, mostly for western Montana. The coldest period of the month brought low temperatures below freezing to portions of central and southwest Montana. Newlan Creek dropped to 19°F on the 23rd, and Bozeman airport recorded their earliest frost since 1968. Under the high pressure ridge aloft, west winds brought smoke from western fires. Two period, from the 19th-21st and 24th-30th, had some of the longest periods of bad air quality in recent memory. In fact, at Great Falls, the May through August period of 2015 has had the highest number of hours of visibility restrictions of less than 3, 4, 5, and 6 miles since 1980 (Fig. 4). Isolated thunderstorms again moved through central Montana on the 29th. Wind gusts reached 59 mph at Great Falls and 68 mph at Havre. Strong west winds pushed over the northern Rockies on the 30th and 31st. Wind gusts peaked at 72 mph at Babb on the 30th and 82 mph at Deep Creek on the 31st. The strong winds also brought relief from the smoky conditions. Cut Bank had an average wind speed of 24.1 mph on the 30th, their windiest August day since 1999.

Precipitation/convection

Severe convective weather occurred on 8 days in August. The normal for August is 8 days. Many of the severe weather reported is listed above. For the year, there have been 29 severe weather days in the state. The normal for this period is 37 days. This is the lowest number of severe weather days, through August, since 1992.

Summer period

The summer period (June-August) for Montana averaged the 19th warmest of record. The average temperature was 67.0°F, two degrees above normal and the warmest since 2012. The greatest positive departures were in the west (Fig. 5). Precipitation averaged 4.17-inches, 0.97-inches below normal. This was the 35th driest of record and the driest since 2012. The driest areas were over the northwest, and the wettest in the east (Fig. 6). Winds averaged 7.8 mph, 0.5-mph below normal. This was the seventh calmest summer period of record.

August summary information:

High Temperature	107°F at Wolf Point (14 th)	Greatest Precip	3.52" at Ridgeway
Low Temperature	19°F at Newlan Creek (Meagher) (23 rd)		3.80" at Fisher Creek (Park)
Warmest Ave Temp	73.1°F at King Coulee	Peak Wind Gust	72 mph at Babb (30 th)
Coolest Ave Temp	49.7°F at Placer Basin		82 at Deep Creek (31 st)
Range of Temp departures	-0.5°F at Billings to +2.3° at Great Falls	Highest Ave Wind	12.1 mph at Sweet Grass 13.9 mph at Deep Creek
21 city mean monthly Temperature/Normal	67.3/66.8F 0.5F above normal. 60 th warmest of record (since 1880). 55 th percentile. Oct-Aug 44.4/42.1 1.5F above normal. 15 th warmest of record.	20 city mean monthly wind speed/Normal	7.7 mph/8.1 mph; 19 th calmest of record (since 1936). 25 th percentile. Oct-Aug 8.8 mph/9.4 0.6-mph below normal. 15 th calmest of record.
22 city mean monthly precipitation/Normal	0.85/1.17" – 73% of normal. 50 th driest of record (since 1880). 36 th percentile. Oct-Aug 12.46"/13.69" – 1.23" below normal. 43 rd driest of record.		

**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

Location	Aug	% of Norm	Rank	Pcntl	Oct 1 – Aug 31	% of norm	Rank	Pcntl	Years
Baker	2.25	232%			12.94	123%			17
Billings	0.91	107%	72	63	11.41	85%	61	55	111
Belgrade	0.73	68%	30	37	11.00	85%	21	26	78
Butte	0.67	49%	45	36	9.20	78%	29	23	121
Cut Bank	0.60	52%	33	30	8.45	88%	28	25	107
Dillon	0.30	28%	13	16	7.87	81%	27	35	75
Glasgow	0.84	68%	50	42	10.75	100%	52	45	115
Great Falls	0.38	24%	26	20	11.00	83%	31	25	123
Havre	0.74	67%	57	41	10.14	101%	59	43	135
Helena	0.28	23%	21	15	8.40	83%	28	20	137
Jordan	1.60	134%			11.75	102%			17
Kalispell	0.13	13%	12	9	12.93	83%	41	33	121
Lewistown	1.12	65%	51	42	13.62	88%	35	29	119
Livingston	1.25	113%	69	61	12.11	89%	43	39	109
Miles City	0.76	84%	66	47	8.07	71%	13	9	138
Missoula	0.20	17%	21	15	11.47	88%	44	34	129
Mullan Pass	0.45	34%	23	29	37.28	102%	41	56	73
Wolf Point	1.16	91%			8.71	78%			17
Glendive	0.77	56%	47	39	11.80	96%	47	41	112
Sidney	1.43	123%	43	56	13.10	100%	41	54	75
BZN-MSU	1.22	85%	78	56	14.38	79%	22	16	130

Rankings and Percentiles are 1=driest, higher numbers=wetter.

For an automated version of this chart, updated daily, go to

<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>

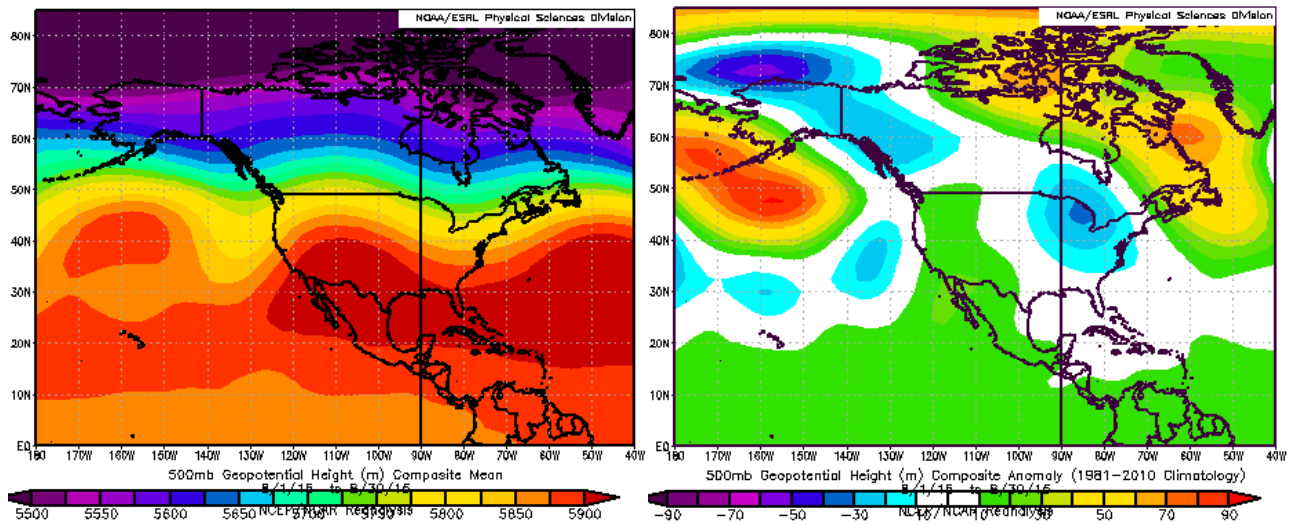


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (top-left) and departure from normal (top-right).

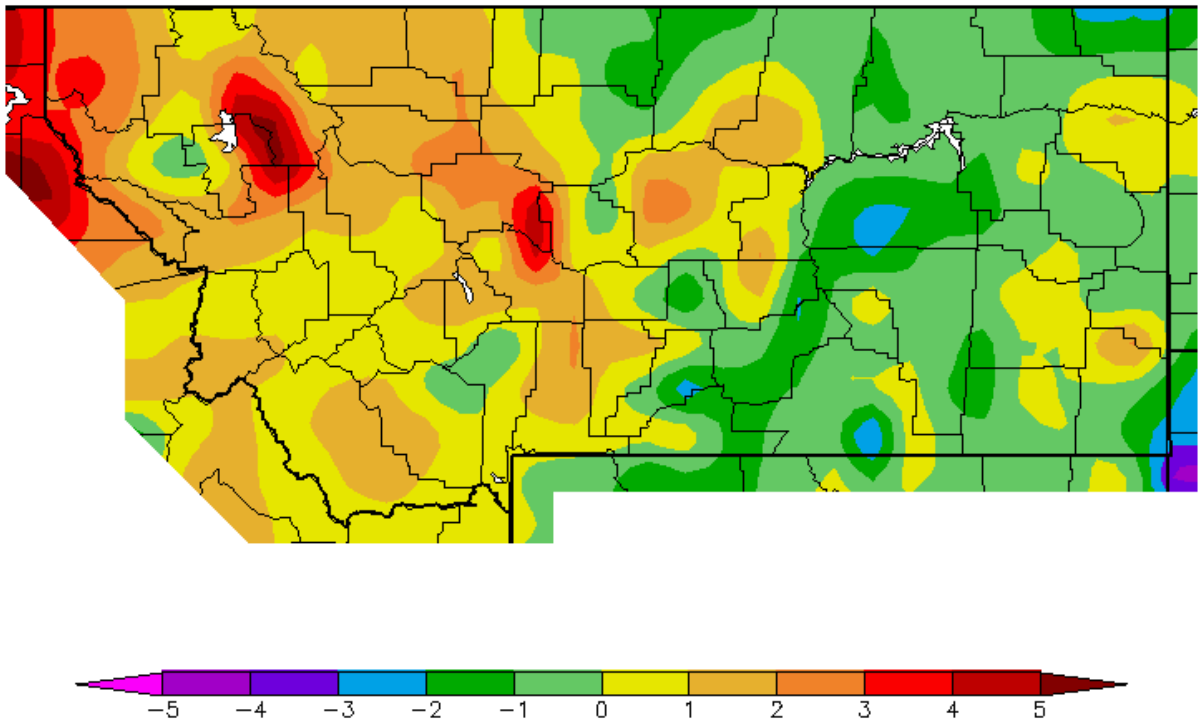


Figure 2. August 2015 temperature departures from normal (°F) (Western Region Climate Center).

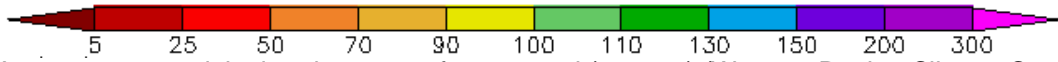
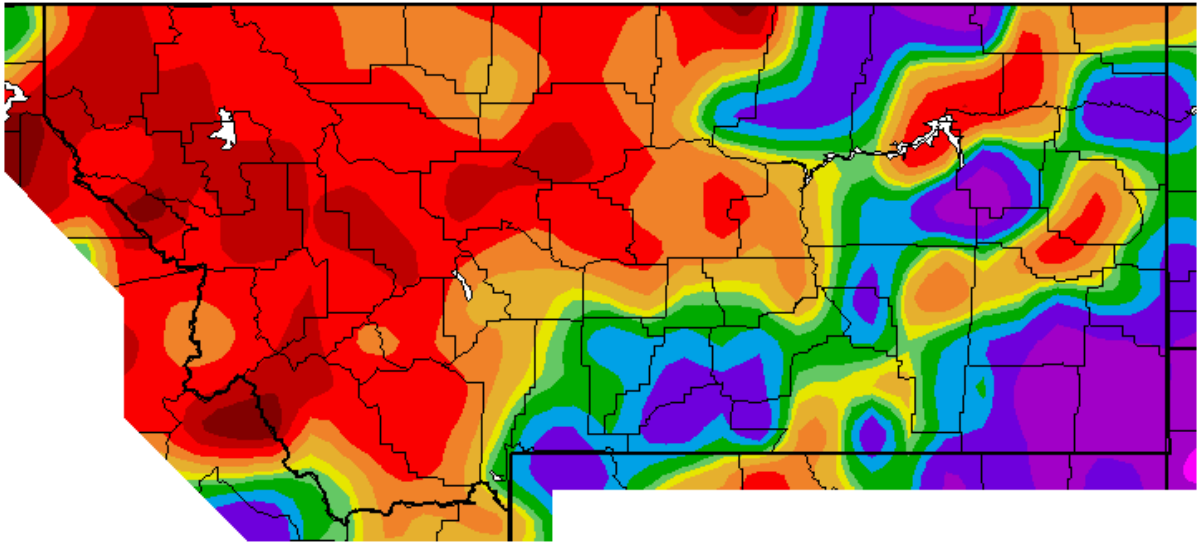
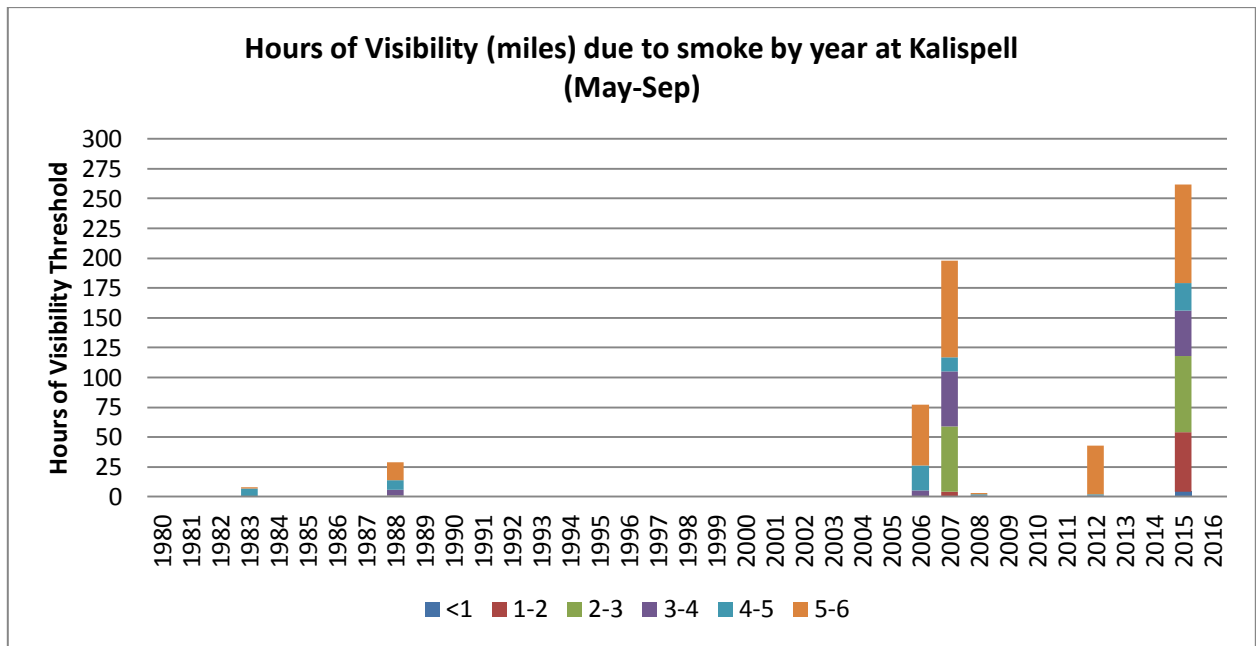
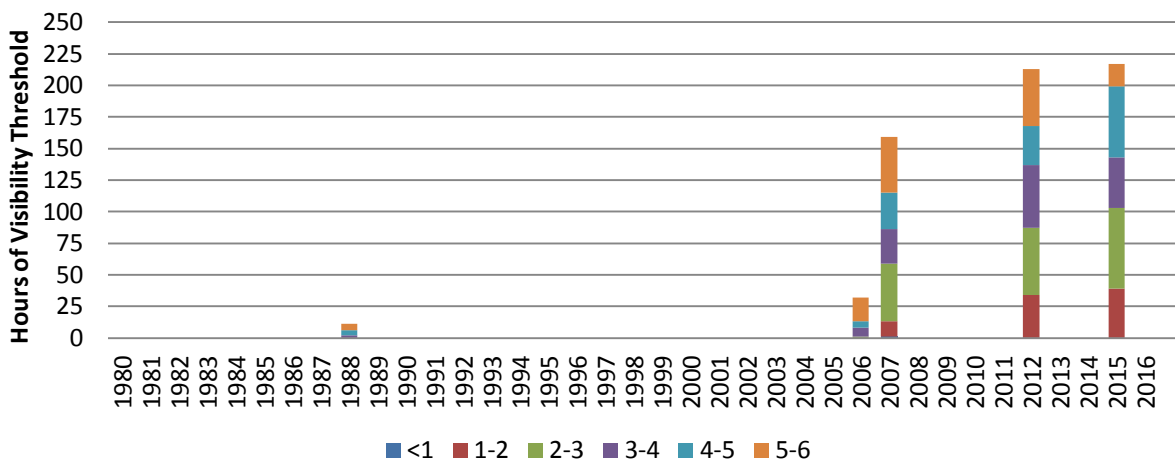


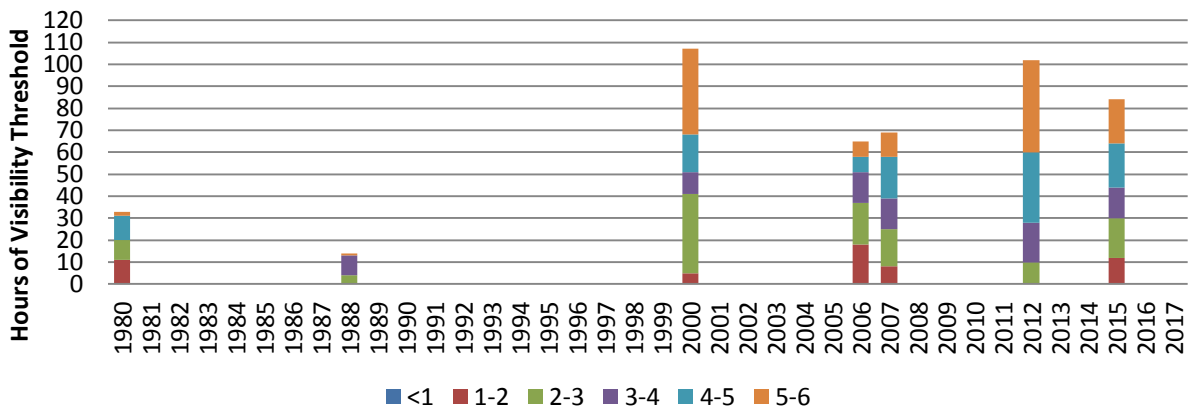
Figure 3. August 2015 precipitation departures from normal (percent) (Western Region Climate Center).



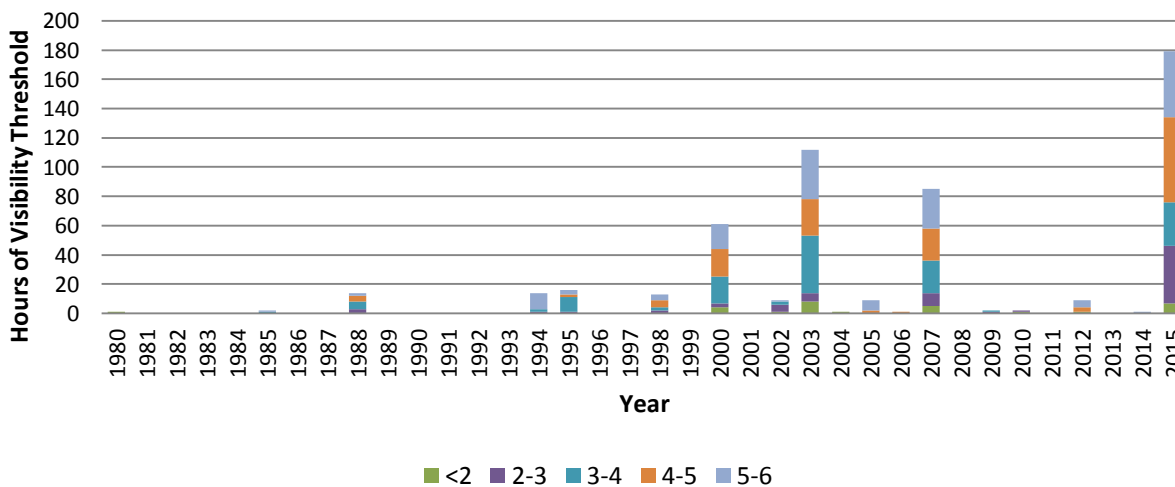
**Hours of Visibility (miles) due to smoke by year at Missoula
(May-Sep)**



**Hours of Visibility (miles) due to smoke by year at Bozeman
(May-Sep)**



**Hours of Visibility (miles) due to Smoke by Year at Great Falls
(May-Sep)**



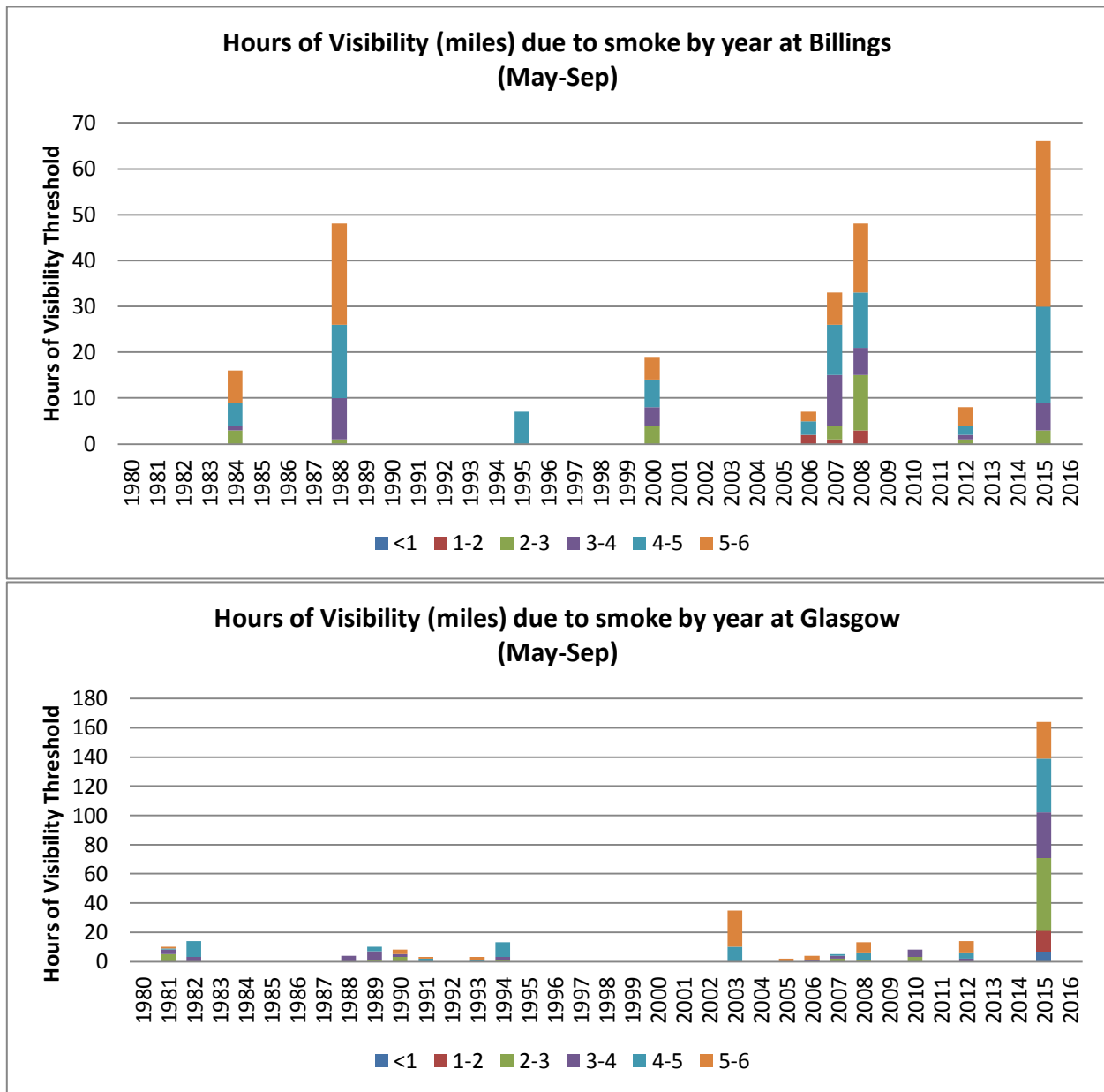


Figure 4. Hours of visibility of threshold values reduced by smoke at Great Falls. There have been 179 hours of visibility restrictions of six miles or less in 2015 due to smoke. 2013 had 112 hours of the same. Helena and Bozeman recorded more hours of such restriction in 2000, while Dillon has had the highest number of hours of such restriction due to smoke in 2007. Glasgow experienced a few periods in July when smoke from Canadian grass and forest fires spread over eastern Montana. This period, along with the smoky periods in August contributed to a large number of hours of visibility restriction due to smoke in 2015.

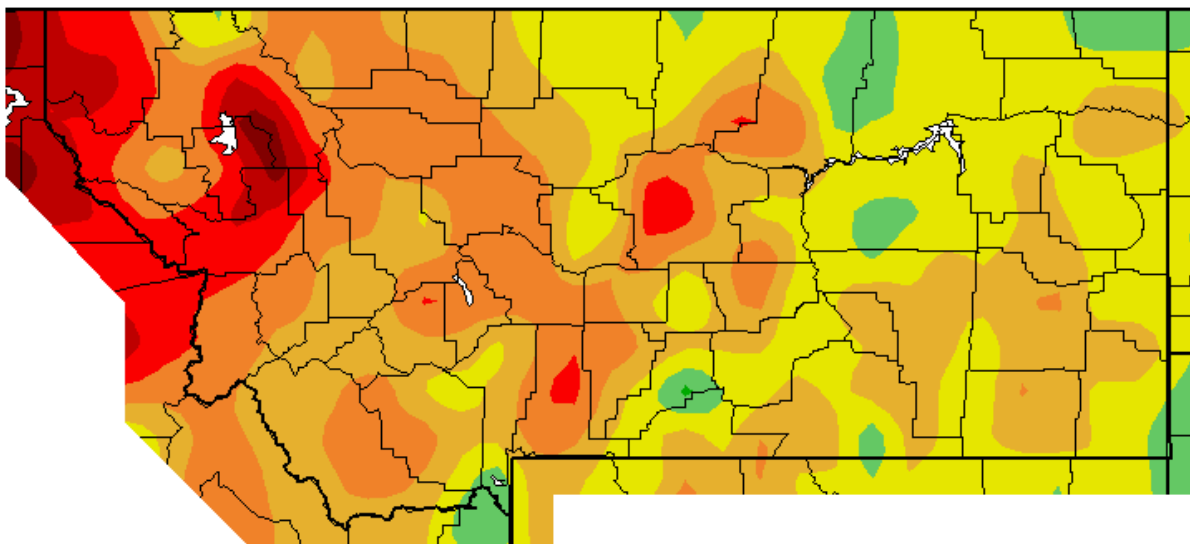


Figure 5. Jun-Aug 2015 temperature departures from normal (°F) (Western Region Climate Center).

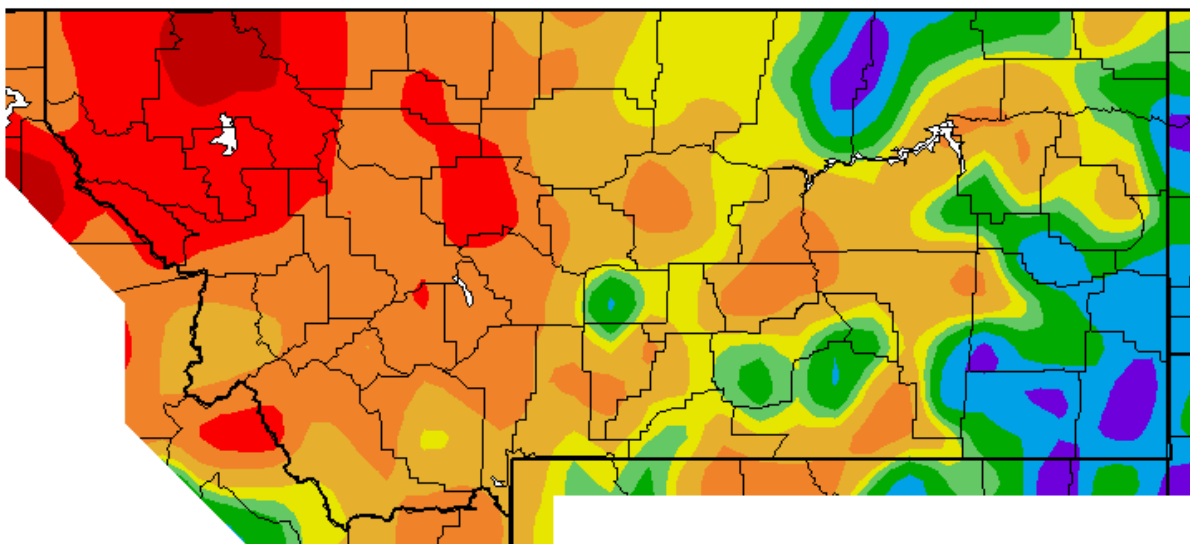


Figure 6. June-Aug 2015 precipitation departures from normal (°F) (Western Region Climate Center).

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to:

<http://www.wrh.noaa.gov/tfx/climate/monthlysum/climatesum.php?wfo=tx>

For the latest information on mountain snowpack from the NRCS, go to: <http://www3.wcc.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the National Drought Mitigation Center, USDA and NOAA, go to: <http://droughtmonitor.unl.edu/>

These data are preliminary and have not undergone final QC by NCDC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov>. Many more links are on the Drought Information Page of the NWS Great Falls web site at <http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tx>. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.